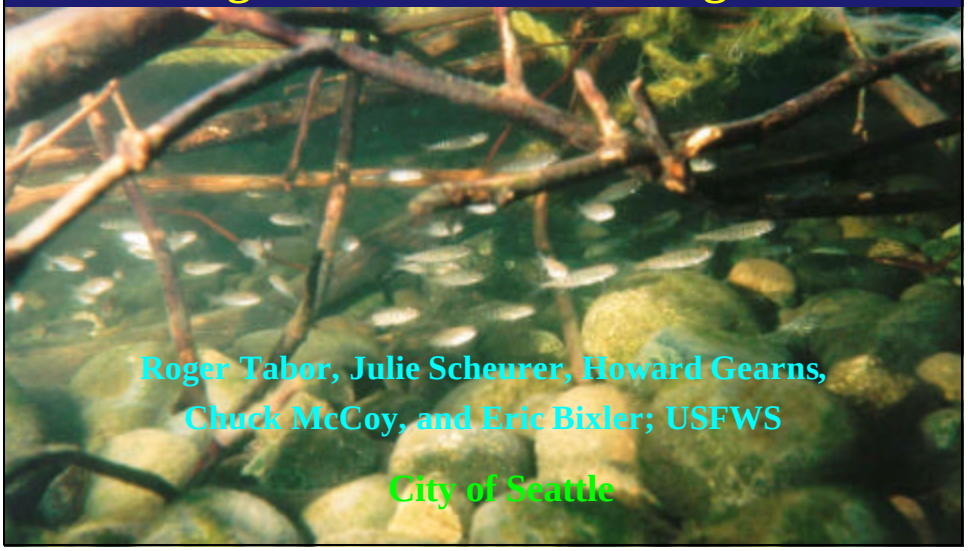
Nearshore habitat use of juvenile Chinook salmon in the Lake Washington basin, 2002 investigations



Roger Tabor, Julie Scheurer, Howard Gearns,
Chuck McCoy, and Eric Bixler; USFWS

City of Seattle

Background

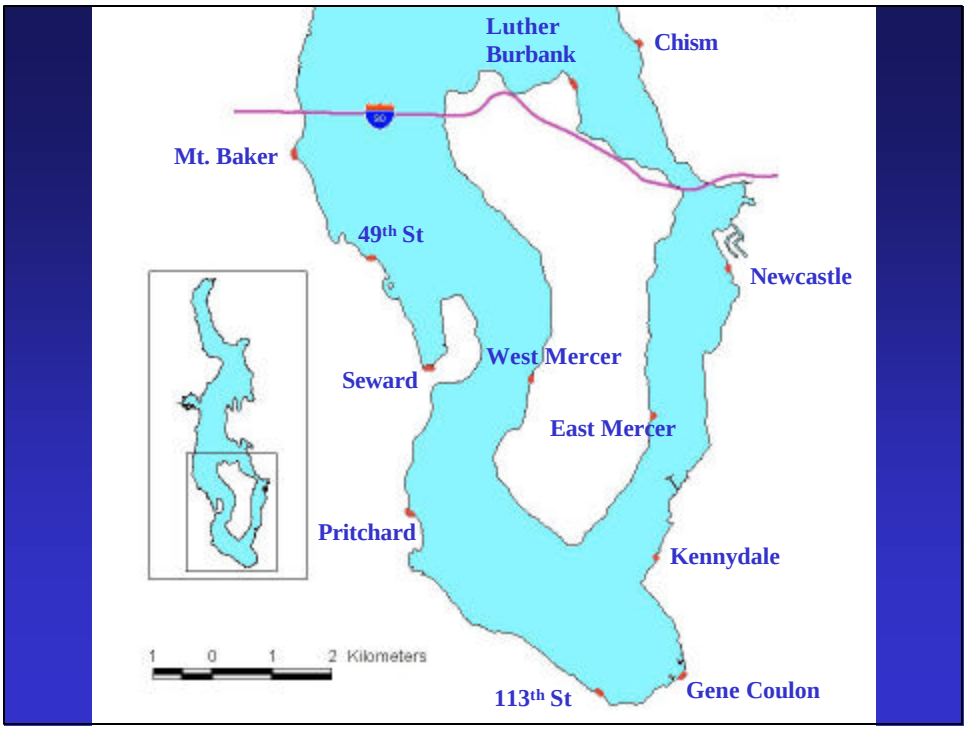
- Juvenile Chinook inhabit the nearshore area from February to mid-May
- Prefer shallow water with a gentle slope and small substrate
- Active during the day and sometimes use overhead cover especially when small
- At night are inactive, rest on the bottom away from cover
- After mid-May move into deeper water but little is known about their habitat use

Study Elements - 2002

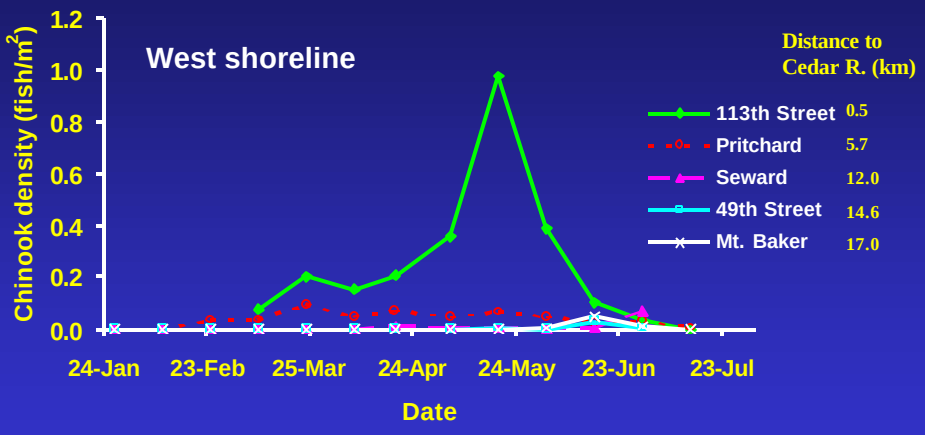
- Temporal and spatial distribution - Index sites
- Woody debris and Overhanging vegetation
- Tributaries
- Hydroacoustic surveys

Index Sites

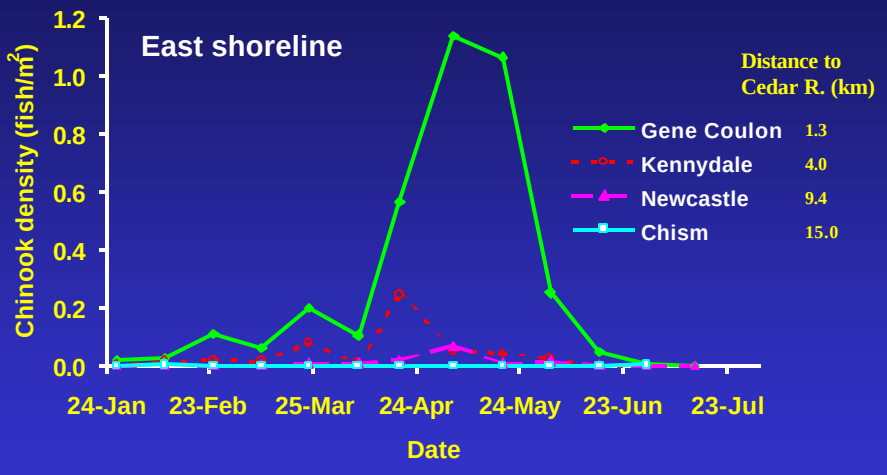
- Examine temporal and spatial distribution of Chinook in south Lake Washington
- Selected high-quality sites (gentle slope with sand/gravel substrate)
  - 5 along west shoreline
  - 4 along east shoreline
  - 3 on Mercer Island
- Night snorkeling along two depth contours – 0.4 and 0.7 m depth
- Surveyed once every two weeks from January to July


Luther Burbank
Chism
Mt. Baker
49th St
Newcastle
West Mercer
Seward
East Mercer
Pritchard
Kennydale
1 0 1 2 Kilometers
113th St
Gene Coulon

Index Sites

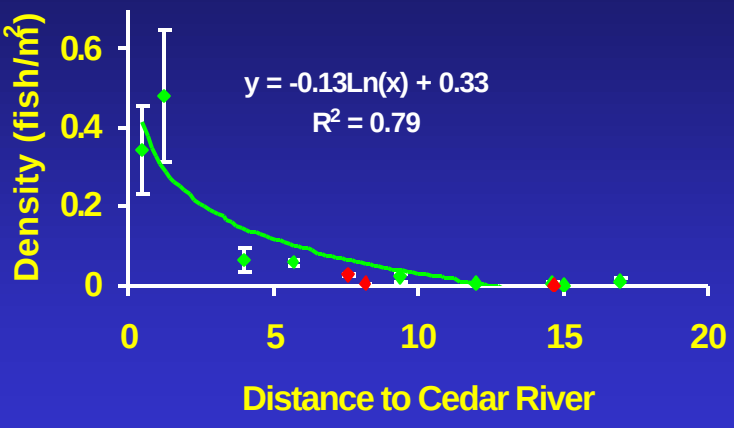

West shoreline
Chinook density (fish/m2)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
24-Jan
23-Feb
25-Mar
24-Apr
24-May
23-Jun
23-Jul
Date
Distance to Cedar R. (km)
113th Street 0.5
Pritchard 5.7
Seward 12.0
49th Street 14.6
Mt. Baker 17.0

Index Sites



Index Sites

March 24 – June 16

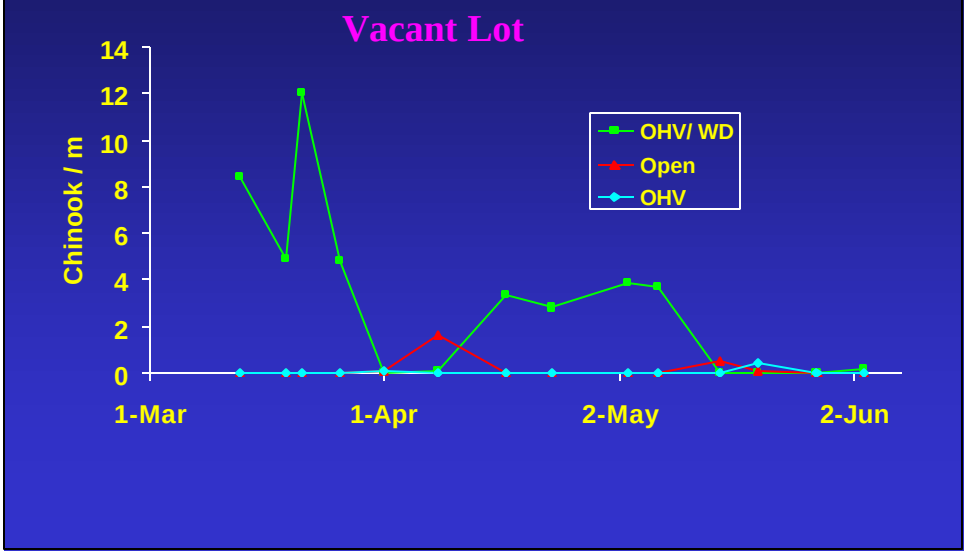


Woody debris and Overhanging Vegetation Sites

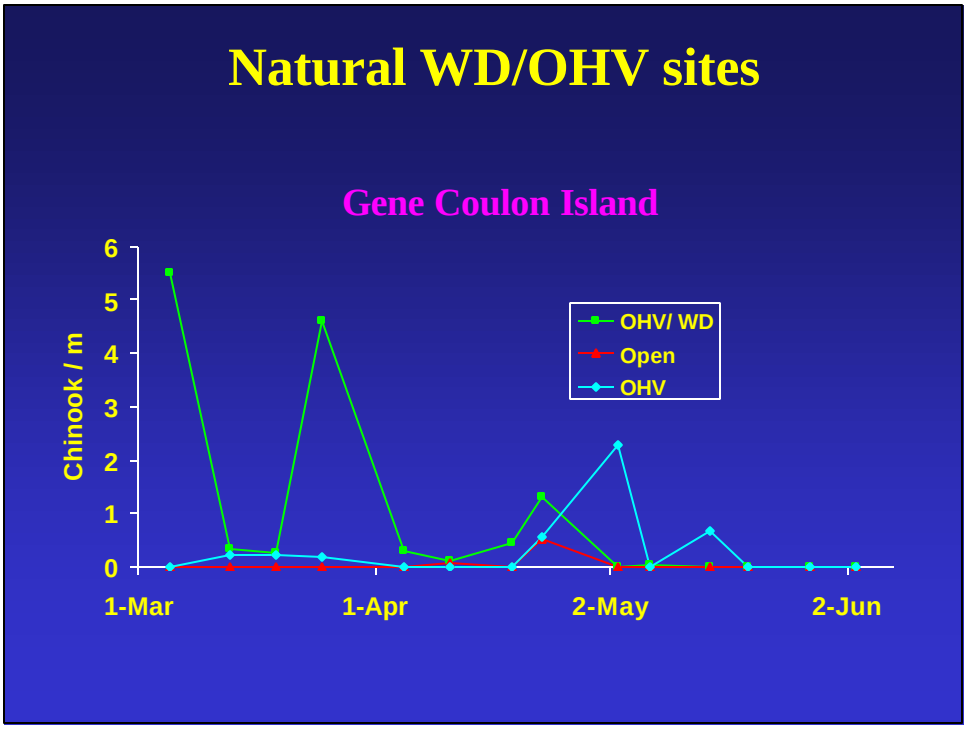
- Natural WD/OHV sites
  - Two south end sites: Gene Coulon island (east) and vacant lot (west)
  - Compare sites to adjacent sites without WD or OHV
  - Surveyed once a week from March to June
- Woody debris experiment
  - Conducted in north Gene Coulon Park
  - 3 shoreline sections with WD and 4 without WD
  - Surveyed once a week from March to June

Natural WD/OHV sites

Natural WD/OHV sites

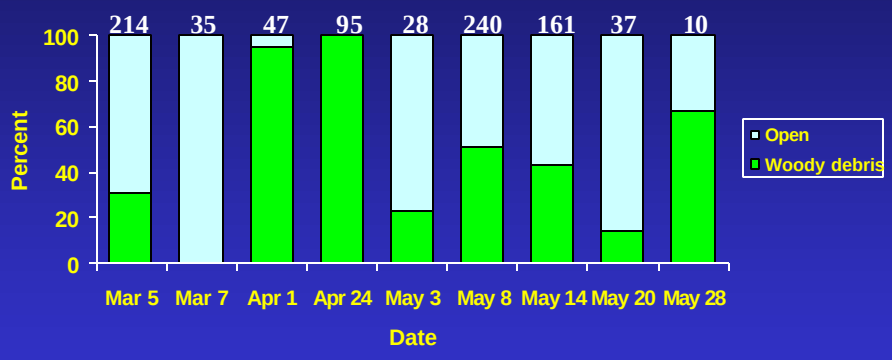


Natural WD/OHV sites



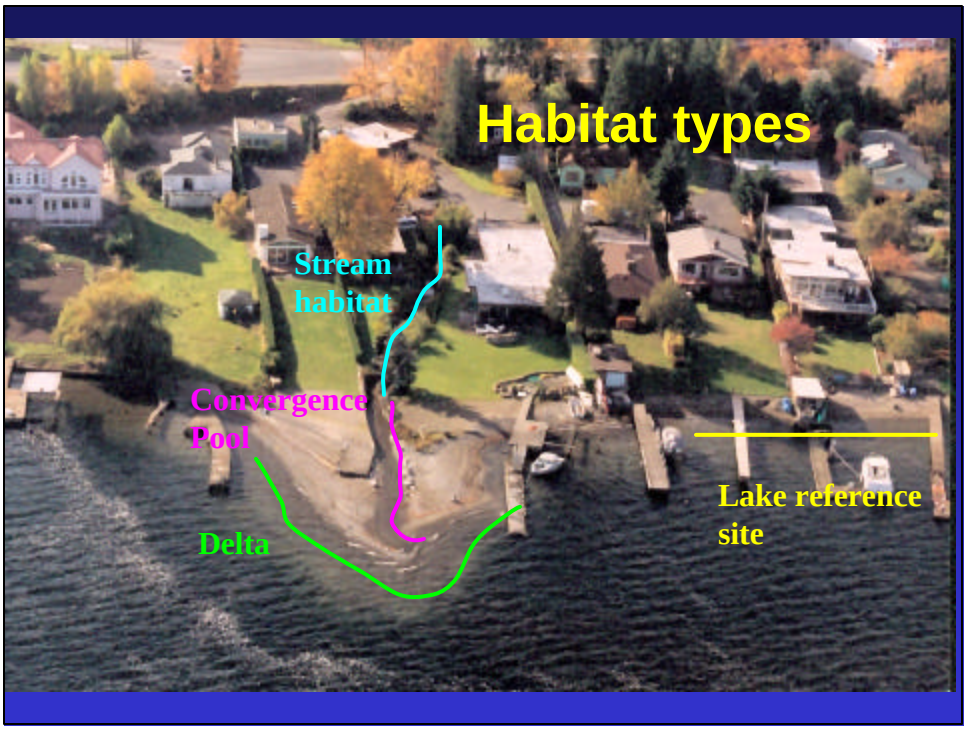
Woody Debris Experiment

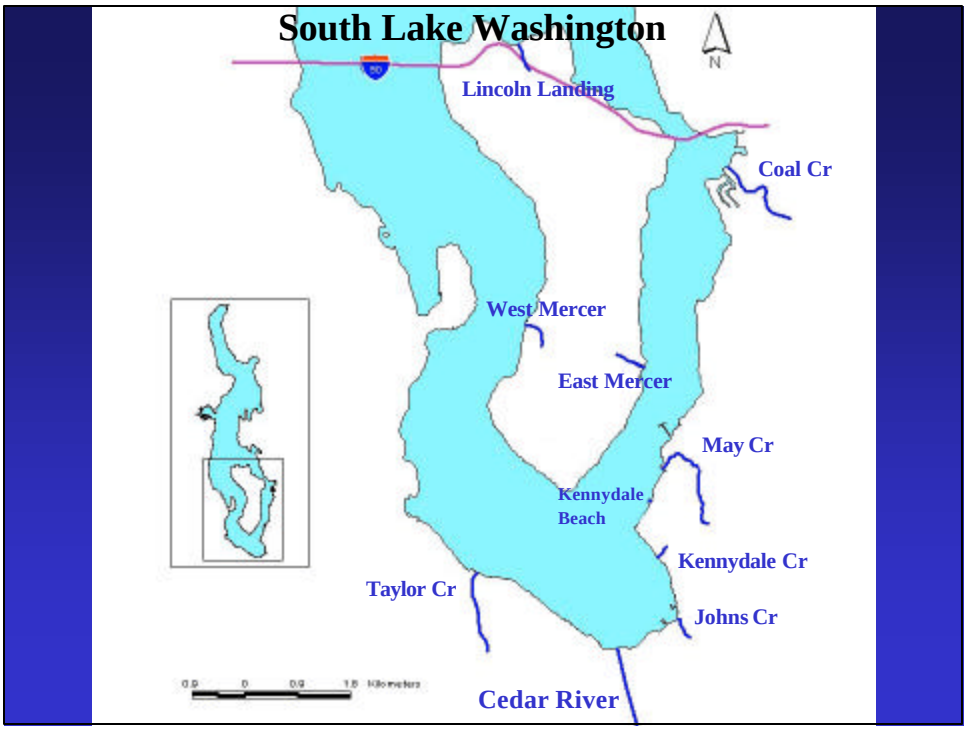
Woody Debris Experiment

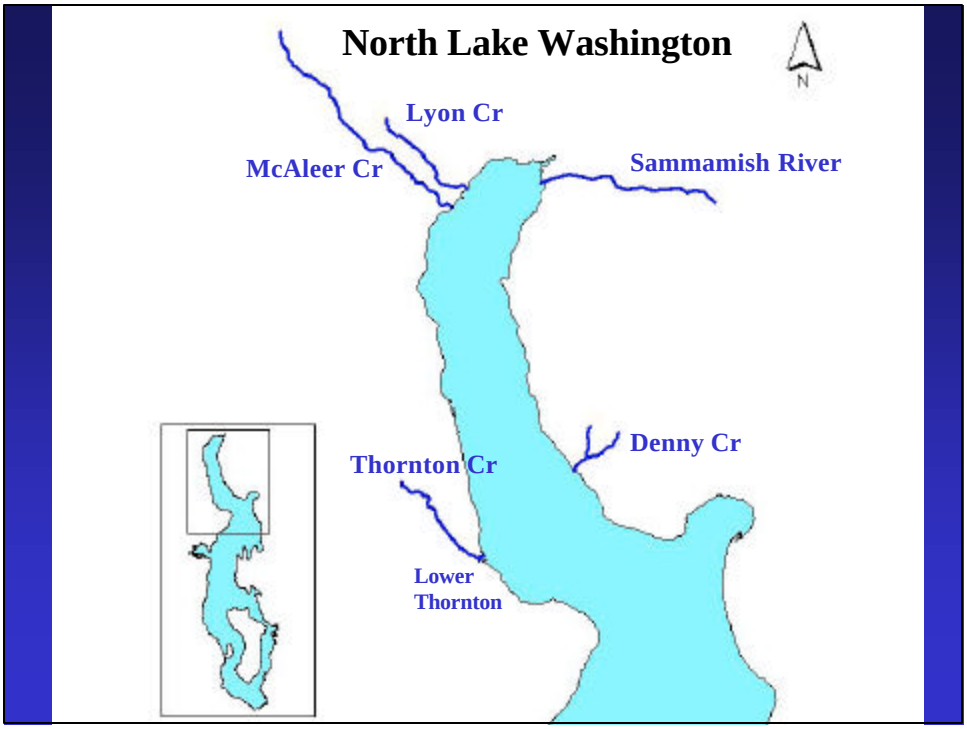


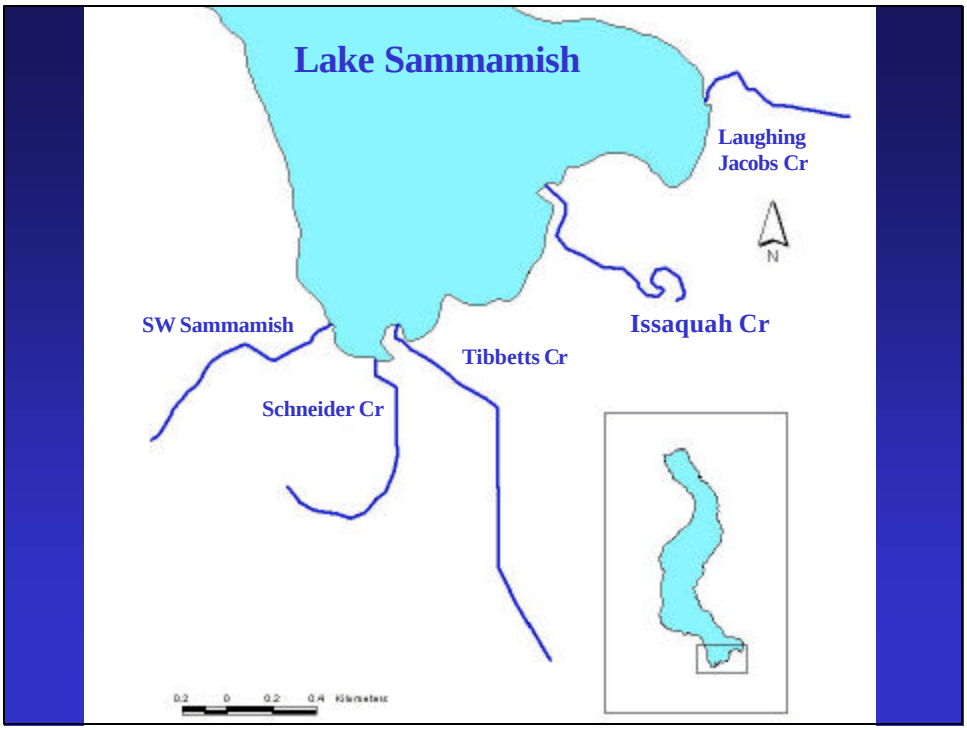
Tributaries

- Examine use of tributaries by Chinook
- Surveyed tribs in south and north Lake Washington and south Lake Sammamish
- Surveyed four main areas:
  - Tributary, convergence pool, delta, and lake reference site
- Night snorkeling
- Surveyed roughly once a month


Habitat types
Stream habitat
Convergence Pool
Delta
Lake reference site

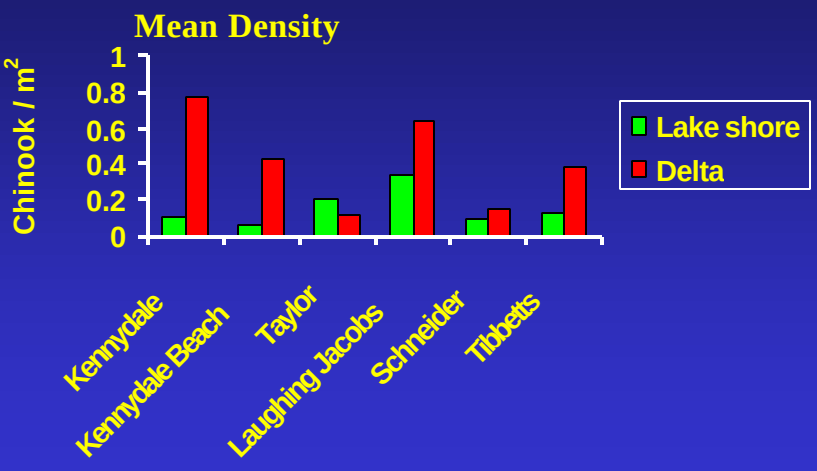

South Lake Washington
N
Lincoln Landing
Coal Cr
West Mercer
East Mercer
May Cr
Kennydale Beach
Kennydale Cr
Taylor Cr
Johns Cr
Cedar River

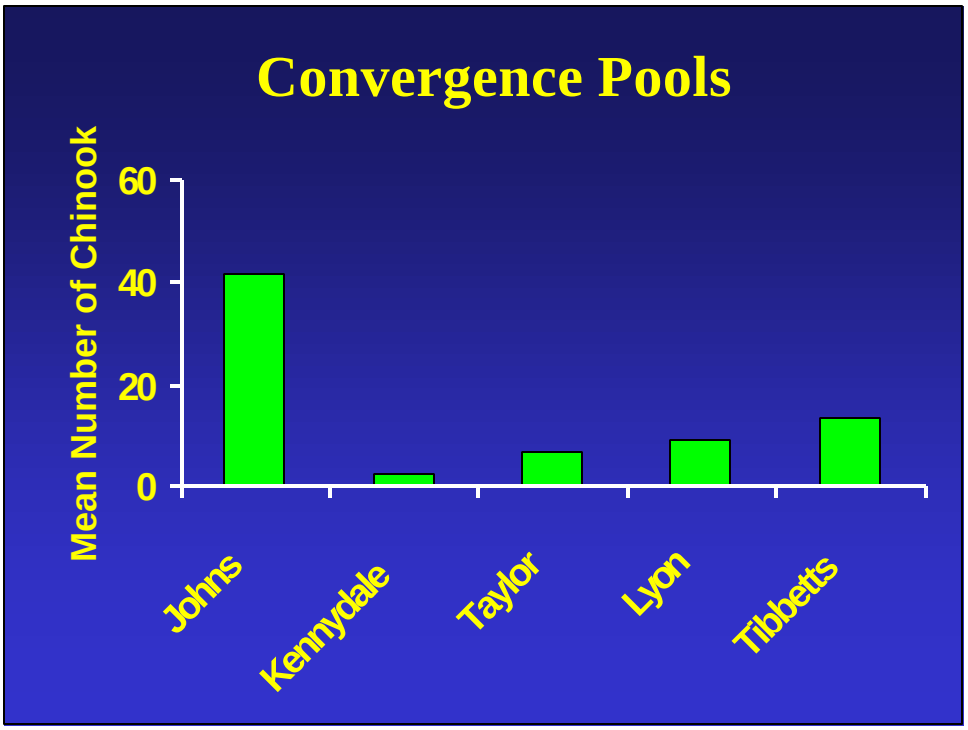

North Lake Washington
N
Lyon Cr
McAleer Cr
Sammamish River
Denny Cr
Thornton Cr
Lower Thornton

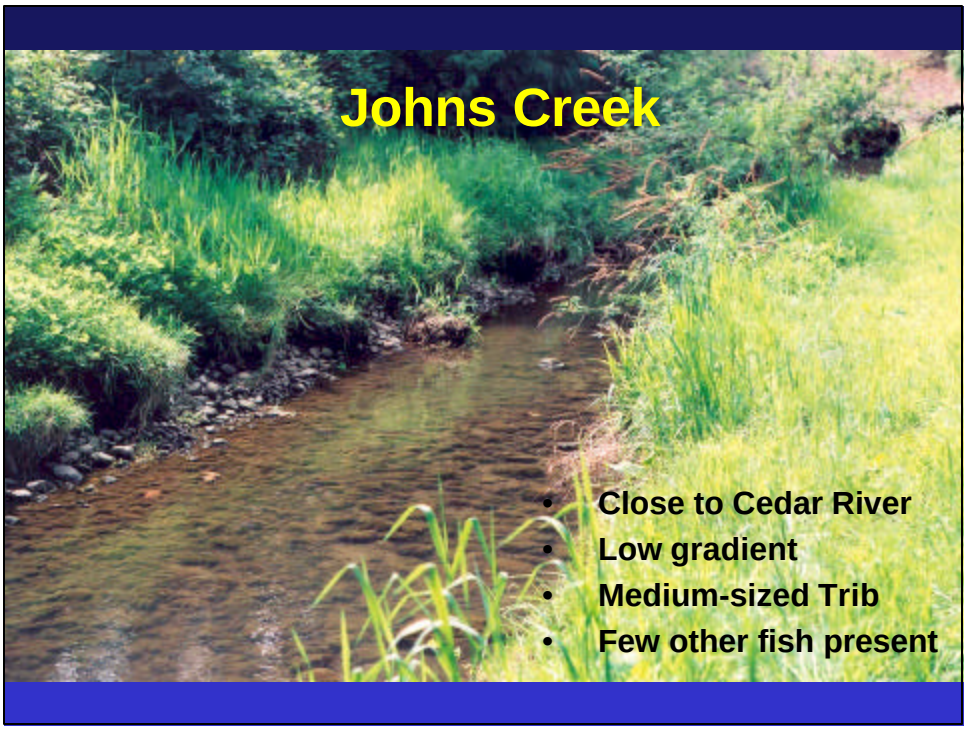


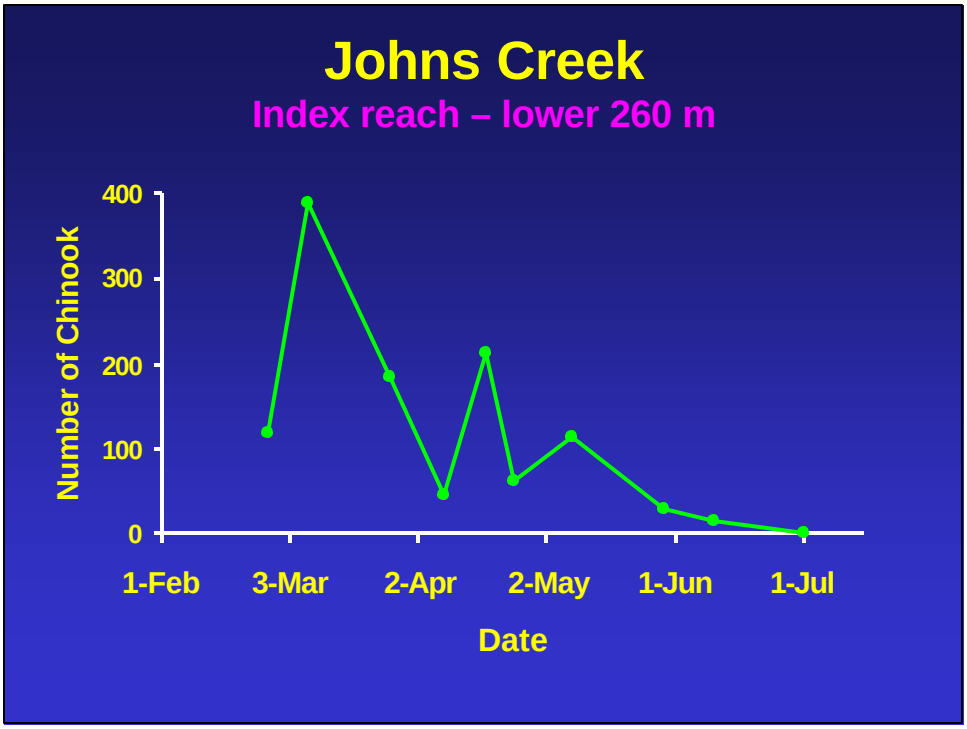
Delta / Lake shore

South L.Washington and L. Sammamish




Convergence Pools
Mean Number of Chinook
60
40
20
0
Johns
Kennydale
Taylor
Lyon
Tibbetts


Johns Creek
• Close to Cedar River
• Low gradient
• Medium-sized Trib
• Few other fish present

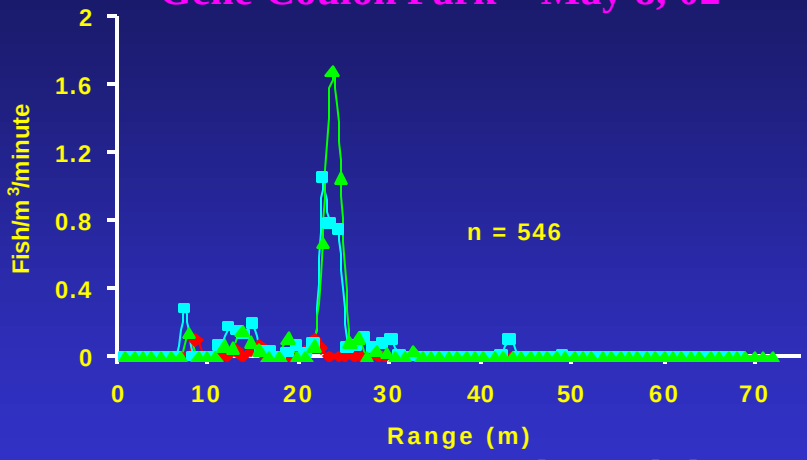

Johns Creek
Index reach – lower 260 m
Number of Chinook
400
300
200
100
0
1-Feb
3-Mar
2-Apr
2-May
1-Jun
1-Jul
Date

Hydroacoustic Surveys

- Preliminary assessment of hydroacoustic equipment to determine Chinook habitat use
- Used when Chinook have moved into deeper water, e.g. > 1 m depth
- Fixed and mobile surveys
- Side-scanning sonar
- Ship Canal and south Lake Washington
- Surveys conducted in May-July

Hydroacoustics Survey - Fixed

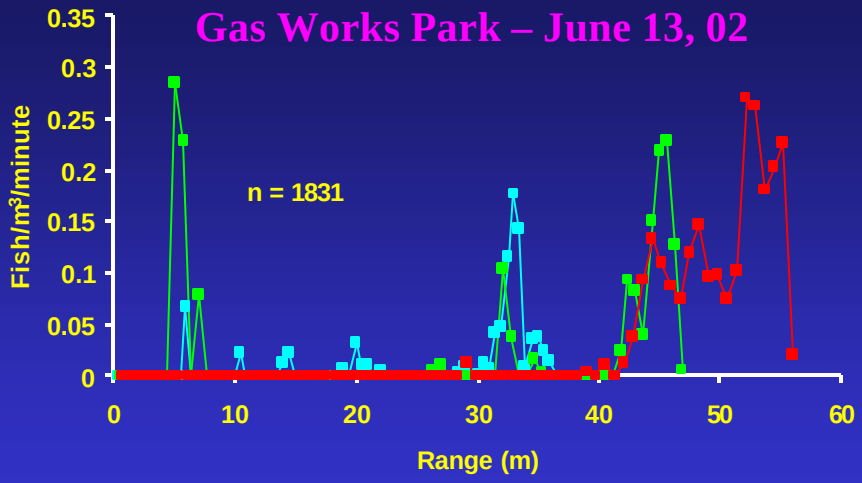
Gene Coulon Park – May 8, 02



Night snorkeling: 74%
Chinook salmon

Hydroacoustics Survey - Fixed

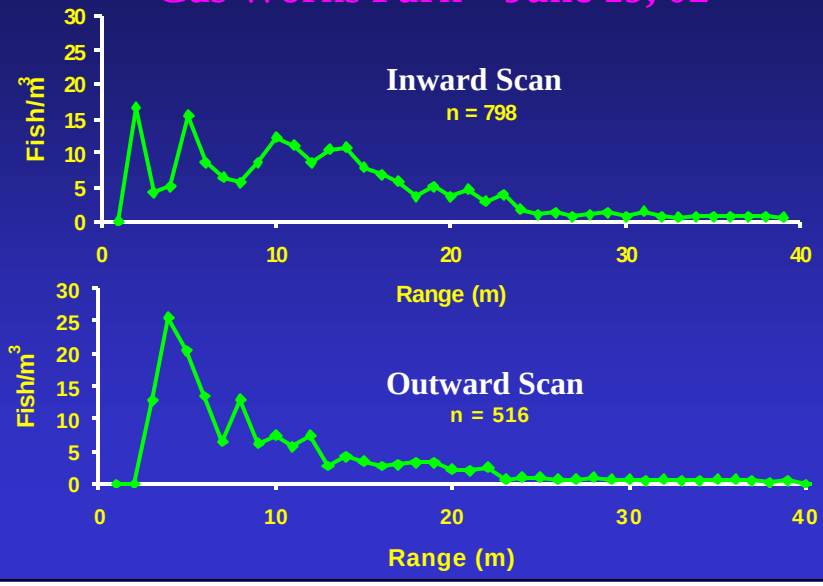
Gas Works Park – June 13, 02



Purse seine (D. Seiler, WDFW):
77% Chinook salmon

Hydroacoustics Survey - Mobile

Gas Works Park – June 19, 02



Conclusions

- Chinook were concentrated in the south end from February to May
- WD/OHV appears to be a valuable habitat feature
- Non-natal tributaries provide additional habitat for Chinook
- Chinook use the deltas, convergence pools, and upstream habitats if suitable habitat is available

Future Research Questions

- Does the temporal and spatial distribution vary from year to year?
- What is the residence time of Chinook?
- Are small tributaries important foraging sites?
- What is the behavior and movement patterns of outmigrating Chinook?